

**ORTHOPTERA IN THE LONDON ARCHIPELAGO**

JOHN PAUL

*4 Stephen Road, Headington, Oxford OX3 9AY.*

AT FIRST SIGHT, the urban sprawl of the metropolis may not appear to be a suitable place to study Orthoptera but on closer scrutiny one becomes aware of an archipelago of sites that allows analysis of the impact of urbanisation on this group of insects. Each locality has its own character, history, degree of isolation and orthopterous fauna. Some localities such as Richmond Park and Rainham Marshes preserve fragments of semi-natural vegetation, possibly little changed for centuries. The Orthoptera faunas surviving on them resemble those of comparable rural locations and give one an idea of what the original London fauna was like before the growth of the city. Comparison with the Orthoptera found at sites more degraded by urbanisation suggests which species may be best able to adapt and survive and which may be lost as man alters the landscape. Manicured urban parks, sportsgrounds, lawns, roadside verges and building plots have been completely stripped of their natural vegetation and original Orthoptera. Examination of such sites indicates which species are able to disperse through an urban environment and exploit these new man-made habitats. One can investigate such sites as biologists have studied the colonisation of volcanic islands and determine which species have been able to exploit these novel habitats.

Large-scale urbanisation is a very new phenomenon but is only the latest in a series of man-made changes to the natural environment and observations on the adaption by insects to city life may provide evidence regarding their responses to previous upheavals. Very little of the British landscape is truly *primaeval* and most, if not all, of our Orthoptera have needed to adapt to man-made landscapes. Some habitats such as lowland heaths and chalk downland are of such antiquity that we tend to see them as being completely natural. However, they were created and sustained by human activity. Urbanisation is prone to degrade such habitats either through neglect of traditional rural management systems allowing the natural climax vegetation to assert itself or through the recreational pursuits of city dwellers destroying fragile plant communities.

Historic London Orthoptera records are sparse. Stephens (1835) produced a pioneering account of British Orthoptera, including several London localities. The Dale Collection, in Oxford contains historic specimens from the same period. More recently, Payne (1958) wrote a comprehensive review of Orthoptera occurring within 20 miles of St. Paul's Cathedral and Farrow (1962) surveyed the Croydon district. Skelton (1985) performed a survey of the London area and Marshall and Haes (1988) provided distribution maps for all the British Orthoptera. Recent reports on London Orthoptera include those of Burton (1993), Herbert (1993), Murdoch (1993) and Widgery (1978).

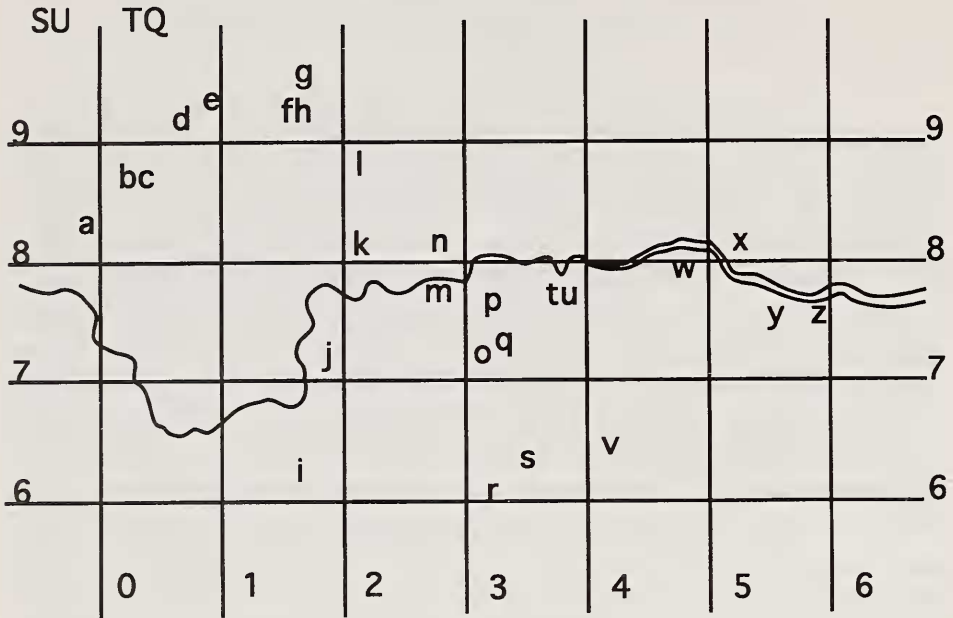


Figure 1. Sites examined in relation to the National Grid and the Thames.

**Key:**

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|-------------------------------|--|
| a, Stoke Common               | n, Regent's Park   |
| b, M25-M40 junction           | o, Brockwell Park and Peabody Hill                           |
| c, Denham                     | p, Lilford Road, Ruskin Park, Denmark Hill and Champion Hill |
| d, Batchworth Common          | q, Dulwich Hamlet, Dulwich Common and Dulwich Wood           |
| e, Colne Valley               | r, Riddlesdown   |
| f, Caldecote Hill             | s, Addington Hills   |
| g, M25-M1 junction            | t, Greenwich Park  |
| h, Watling Farm               | u, Blackheath  |
| i, Esher Common               | v, Hayes Common  |
| j, Richmond Park              | w, Erith Marshes   |
| k, Wormwood Scrubs            | x, Rainham and Wennington Marshes and Ingrebourne River      |
| l, Colindale                  | y, Dartford Marshes  |
| m, Lockington Road, Battersea | z, Greenhithe.   |

Frequent visits to London in 1993 and a period of being based in the capital during 1994, provided an opportunity to sample the London Orthoptera and develop ideas on the effects of urbanisation on these insects. Sites were selected for investigation which included some sites mentioned by Payne (1958) and Farrow (1962) as being of special interest, plus a sample of parks, commons, sportsgrounds, wastelands and roadsides. Thus, it was possible to compare the present fauna with that described in the literature and to compare the spectra of species found in various types of habitat. A comparison was also made with a survey of urban Orthoptera in the West Midlands (Paul, 1991) in order to assess how London's geography, geology and climate might have affected the composition of its fauna. The

present account of London's Orthoptera is by no means exhaustive and aims to describe the effects of urbanisation by looking at selected sites. All records were made by the author and relate to summer 1994 unless otherwise stated.

### Species found

#### *Meconema thalassinum* (De Geer)

Denmark Hill, Champion Hill, Ruskin Park, Greenwich Park, Richmond Park. Numerous specimens were found on paths under trees or attracted to light. Its existence on horse chestnut and lime trees planted in urban streets suggests it to be an effective colonist in the urban environment.

#### *Tettigonia viridissima* (L.)

Erith Marshes, Rainham. Hundreds were heard stridulating on wasteground at Erith Marshes. The former marshland is now occupied by two strips of dual carriageway and an industrial estate but enough scrub remains for this insect to flourish. At Rainham the species was found in small numbers along the River Ingrebourne. This insect can survive in habitat badly degraded by urbanisation but does not appear to spread to visually similar adjacent areas.

#### *Pholidoptera griseoptera* (De Geer)

Greenhithe, Rainham. Abundant on wasteland at both sides. This insect does well in places disturbed by man, where there are nettle beds, brambles and rough grassland. However, being flightless, this species seems unable to reach new wasteland sites that develop in inner urban areas.

#### *Metrioptera brachyptera* (L.)

Farrow (1962) gave a gloomy account of how this species was just surviving on degraded heathland at Addington Hills, its only London locality. When the locality was visited in suboptimal conditions, this species was not found but there is a record from 1991 (*per.* E.C.M. Haes). Just outside Greater London, *M. brachyptera* was found at Esher Common, Surrey and at Stoke Common, Buckinghamshire. In Britain, this insect is strongly associated with heathland and is one of the first Orthoptera to disappear as heathland becomes degraded by trampling or development. However, the species has been found in very low numbers at a site devoid of heather on the edge of Birmingham (Paul, 1991).

#### *Metrioptera roeselii* (Hagenbach)

Dulwich Hamlet (derelict sportsground), Lockington Road SW8, Richmond Park, Riddlesdown, Hayes Common, Regent's Park, Watling Farm (1993), Caldecote Hill, M25/M40 junction, M25/M1 junction, Denham (1993), Wormwood Scrubs (1984), Dartford Marshes, Greenhithe, Rainham Marshes. Long known from the London area (Stephens, 1835), the species

had become a rarity by the time of Lucas (1920). Payne (1958) and Farrow (1962) referred to a few peripheral localities. *M. roeselii* has undergone an explosive increase in numbers and range in recent decades, exploiting road verges, wasteground and hot summers during which macropterous forms disperse to new sites. It is now the most common and widespread bush-cricket in Greater London. The isolated Regent's Park locality described by Widgery (1978) was still present in 1994. The verges of the M25 form a huge *M. roeselii* breeding ground and thousands were heard at the M40 junction in 1993 and 1994.

*Conocephalus discolor* (Thunberg)

Dulwich Hamlet (TQ331753), where a single hypermacropterous male was found on a derelict sportsground. This species has spread inland from the South Coast during the last decade, exploiting road verges and neglected fields. One may anticipate its establishment on London urban grassland sites.

*Conocephalus dorsalis* (Latreille)

Esher Common, Rainham Marshes. At Rainham, this species is abundant on the original marshland (Wennington Marshes) but not on the silt beds.

*Leptophyes punctatissima* (Bosc.)

Colne Valley south of Watford (1993). Not specially searched for and possibly overlooked during this survey.

*Tetrix undulata* (Sowerby)

Esher Common, Stoke Common. This species and its congener, *T. subulata*, were not specially sought and were possibly overlooked at other sites during the survey.

*Stenobothrus lineatus* (Panzer)

Richmond Park. A strong but very localised colony on turf along a broad ride.

*Omocestus viridulus* (L.)

Richmond Park, Addington Hills. Limited to well-established, humid grassland.

*Myrmeleotettix maculatus* (Thunberg)

Richmond Park, Addington Hills, Hayes Common. Surviving on relict heathland and grass-heath.

*Gomphocerripus rufus* (L.)

Riddlesdown; its only known locality in Greater London.

*Chorthippus brunneus* (Thunberg)

Colindale, Watling Farm (TQ171945), Lockington Road SW8, Greenhithe, Dartford Marshes, Erith Marshes, Hayes Common, Riddlesdown, Addington Hills, Esher Common, Richmond Park, Greenwich Park, Blackheath, Lilford Road SE5, Brockwell Park, Ruskin Park, Dulwich Hamlet, Dulwich Wood, Rainham Marshes. Thrives on hot well-drained grassland in urban areas.

*Chorthippus parallelus* (Zetterstedt)

Peabody Hill, Dartford Marshes, Greenhithe, Batchworth Common, Richmond Park, Esher Common, Hayes Common, Riddlesdown, Dulwich Common, Stoke Common. Cannot tolerate the arid areas where *C. brunneus* thrives.

*Chorthippus albomarginatus* (De Geer)

Dulwich Hamlet, Brockwell Park, Lockington Road SW8, Blackheath, Erith Marshes, Dartford Marshes, Greenhithe, Rainham Marshes. Abundant around the Thames estuary, but spreading into neglected grassland in urban areas. It can tolerate a combination of flooding in winter and hot dry conditions in summer.

### Habitat types in the London area

#### Chalk Downland

Just south of London, the North Downs include many nationally important stretches of this Orthoptera-rich habitat. Riddlesdown, where there is a colony of *Gomphocerippus rufus*, is the most important example of chalk downland inside Greater London.

#### Heathland

Heathland is of special importance for *Metrioptera brachyptera* and *Myrmeleotettix maculatus* and is vulnerable to scrubbing over through neglect and trampling which destroys the heather. Patches of heath remain in Greater London at Hayes Common, at Addington Hills and just outside at Esher Common, Surrey and Stoke Common, Buckinghamshire.

#### Silaceous grassland (grass-heath)

Richmond Park contains a substantial and nationally important area of this habitat which harbours five species of grasshopper – *O. viridulus*, *C. parallelus*, *C. brunneus* and the local *M. maculatus* and *S. lineatus*.

#### Marsh

The largest area of marshland in Greater London is at Rainham where there is marshland of a sort over a wide area between the town and the Thames and along the River Ingrebourne. Wennington Marshes, where there is a thriving population of *C. dorsalis*, appear to be the least degraded.

Elsewhere in London and for some distance downstream of the Greater London boundary, the Thames marshes are badly damaged by drainage, road schemes and industrial and housing development but important sites for Orthoptera still exist at Erith Marshes, Dartford Marshes and near Greenhithe. *C. albomarginatus* and *M. roeselii* are typical of the Thames marshes with *C. brunneus*, *C. parallelus*, *T. viridissima* and *P. griseoptera* locally abundant.

### Urban Parks

The larger urban parks usually have patches of rough vegetation somewhere that may support *C. brunneus*, *C. albomarginatus*, or *M. roeselii*. *M. thalassinum* may be present on trees. At least one species was found in Regent's Park, Brockwell Park, Greenwich Park and Ruskin Park. No Orthoptera were found in Dulwich Park and St. James' Park which were both unusually well manicured.

### Urban Waste Ground

Derelict urban plots quickly develop into dry grassland and become colonised with *C. brunneus*, *C. albomarginatus*, and *M. roeselii*. All three were found on a small plot of wasteground, isolated by urban development, at Lockington Road, Battersea. A sportsground at Dulwich Hamlet, derelict for about six years, had become colonised with these three species and a single *C. discolor* was also found there. *C. brunneus* and *C. albomarginatus* were still stridulating on 14.x.1994.

### Roadside Verges

Roadside verges typically develop into dry grassland supporting *C. brunneus* and *M. roeselii*. The banks along the M25 motorway are of special importance for *M. roeselii* which can be heard from slow moving traffic.

### Discussion

A total of 16 species of Orthoptera Saltatoria were seen at selected sites in the London area in 1993 and 1994. Most of the species were somewhat localised in their distribution, surviving on relict fragments of semi-natural terrain. In particular, *M. brachyptera*, *S. lineatus* and *G. rufus* seem vulnerable to habitat change and were probably more widespread before the growth of the city. The Dale Collections include a specimen of *G. rufus* from Battersea (a locality now totally unsuitable for this species), supporting Stephens' record (Stephens, 1835). *T. viridissima*, *C. dorsalis*, *O. viridulus* and *M. maculatus* are also associated with special semi-natural sites but appear to tolerate some degradation of habitat.

In contrast to these survivors, *M. thalassinum*, *M. roeselii*, *C. brunneus* and *C. albomarginatus* have been able to disperse through urban London and exploit the novel habitats provided by wasteland, urban parks and roadsides. *P. griseoptera*, *L. punctatissima* and *C. parallelus* are well-adapted to

disturbed habitat but being flightless have limited capacity to disperse. The London Orthoptera fauna is richer than that of the comparable urban area of the West Midlands (Paul, 1991), due to London's proximity to the rich and diverse areas of the Thames estuary, the North Downs and the Surrey Heaths, because of the preservation of fragments of such habitat types within Greater London and because of its more favourable climate. In contrast to London, only one species, *C. brunneus*, is abundant and widespread in urban areas of the West Midlands. However, *M. maculatus* occurs on old mining waste sites in the West Midlands in a habitat not present in London. It is encouraging that several of our rarer Orthoptera have survived on fragments of semi-natural habitat in an area as densely populated as London. It is also encouraging that several species, including *M. roeselii*, which was once considered a rarity, have been able to exploit new urban sites. Urbanisation is an extreme example of human influence on the landscape and observations of its effects on groups such as the Orthoptera provides insight into the more subtle effects of human activity in the countryside.

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### Hazards of Butterfly Collecting – A Biogeographical Anomaly, London 1994

Hazards of butterfly collecting are not limited to field work. They lurk in the literature and in museum collections as well. In 1956, my late friend Henri Stempffer (See *Ent. Rec. J. Var.*, 1992, **104**: 171-172) and Neville Bennett (who I unfortunately never met, though we corresponded, and he named one of my first butterflies new to science) described a new species of butterfly from Liberia as *Baliochila petersi*, accompanied by a good photograph and Stempffer's usual meticulous drawing of the male genitalia. Mild surprise at finding a *Baliochila* in Liberia was expressed.